REMARKS

Applicants respectfully request reconsideration of the present application in view of the reasons that follow.

Status of Claims:

No claims are currently being amended, added or cancelled. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claims remain under examination in the application, is presented, with an appropriate defined status identifier.

Claims 1-12 and 18-20 remain pending in this application.

Applicants appreciate the Patent Office withdrawing the prior art rejections over Lemelson. Applicants address the new prior art rejections below.

Claim Rejections – Prior Art:

In the Office Action, claims 1, 2, 5-12 and 18-20 were rejected under 35 U.S.C. § 102(b) as being anticipated by Japanese Laid Open Patent Appl. JP 60-246190 to Yasuyuki et al.; and claims 3 and 4 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yasuyuki et al. in view of Applicants' Admitted Prior Art (AAPA). These rejections are traversed for at least the reasons given below. Preliminarily, many of the same deficiencies as previously pointed out concerning past rejections apply to the present rejection. If the Examiner continues to believe that the claims should be rejected over the presently applied art, he is respectfully requested to contact the undersigned at the number below.

Applicants are including an English translation of Yasuyuki as an Attachment to the present reply. Yasuyuki et al. discloses a system for transmitting television pictures from a mobile car to a central location via microwave beams to a plurality of fixed antennas. The video signal from the mobile car can be picked up by two of the fixed antennas, which provide the received signal to the central location. At the central location, errors in a synchronizing signal and a burst signal are detected, and one of the two received signals is selected on the basis of the detected errors. In other words, Yasuyuki depends on signal quality of the received signals to determine which signal to use.

Yasuyuki et al. describes a scheme that corresponds to a conventional approach for receiving video from a moving car via plural receivers, in which when the same signal is received at two or more receivers, qualities of the received signal are considered in order to

determine which one of received signals (e.g., the signal received by receiver #1 or the signal received by receiver #2) is to be used. In the second paragraph on page 4 of the English attached language translation, which refers to Figure 2 of that reference, it states that "there are limits to forecasting and switching when, as described here, there are rapid changes in the micro signal receiver function over short distances and it is clear that the present invention can alleviate the workload of the switch operator and prevent major issues." Thus, it is clear that Yasuyuki et al. teaches away from the presently claimed invention by suggesting that the solution to errors in manual location-based switching is via automated switching based on signal quality. In contrast, presently pending independent claim 1 recites that a controller selects and outputs the video signal received by one of the first and second receives in response to the position signal indicative of the mobile object position and in response to change in the position signal as the mobile object moves around a race track. The position signal is obtained using indications other than the parameters of the received video signal. Analogously, the determining location and selecting steps of method claim 12 are not met by Yasuyuki. The present application also discusses the problems with simply relying on signal strength to determine which signal to choose. *See* present specification at pages 8-9.

The Office Action points to base station 7 as corresponding to the position detector that generates the position signal. But, nothing in Yasuyuki indicates that the base station 7 generates a position signal, much less using indications other than the parameters of the received signals. Moreover, given that Yasuyuki uses signal quality of the received video signals to determine which signal to choose, Yasuyuki clearly does not use the position signal as in claims 1 and 12 to select the appropriate video signal. If the Patent Office Examiner disagrees, he is respectfully requested to demonstrate where in Yasuyuki discloses the position signal/location determination and selection of the appropriate video signal based on that position signal/location.

Still further, Yasuyuki et al. teaches away from the presently claimed invention in the paragraph bridging pages 5 and 6 of the English language translation of Yasuyuki et al. Namely, the second sentence of that bridging paragraph states that "The main features of the entire base station described above are that criteria [for switching signals] are established using only the video signals and so there is no need to switch anything but the main line video, and that any transmission path may be introduced between the micro signal receiver and the switch (SW_1)." Furthermore, Figure 4 of Yasuyuki et al., which is said to be a "logic

table for switching control in Figure 3", contains only criteria relating to the detected signals. Thus, Yasuyuki et al. teaches away from using a position signal and changes in the position signal for determining which of video signals received by a first receiver and a second receiver is to be output.

In contrast to the disclosure of Yasuyuki et al., the present system and method provides for automation of location-based switching which avoids problems where a measure of signal quality used to determine whether or not to perform switching does not correctly indicate the better picture. Also, the present invention avoids delay inherent in signal quality measurement, enabling faster switching and therefore accommodating faster moving vehicles.

Therefore, presently pending independent claims 1 and 12 patentably distinguish over Yasuyuki et al.

The dependent claims are patentable for at least the reasons noted for the independent claims. Still further, with respect to dependent claim 7, that claim recites that the position detector determines the position of the mobile object based on information provided by a timing system of the race track. In its rejection of claim 7, the Office Action incorrectly asserts that "the position detector 7 determines the position of the mobile object 6 based on information provided by a timing system of the race track (e.g. between μ_1 and μ_2)." Rather, base station 7 receives signals from first to fifth microwave signal receives 1 to 5, and determines, based on signal quality of those received signals, which one of those is to be output as a video signal. As clearly described on page 4 of the English translation of Yasuyuki et al., **frequency μ_1 is the frequency transmitted by the first microwave signal receiver 1, and μ_2 is the frequency transmitted by the second microwave signal receiver 2, whereby this has nothing at all to do with a timing system of a race track as in claim 7.** The Patent Office Examiner is respectfully requested to show where Yasuyuki actually discloses a timing system providing the noted information.

Accordingly, dependent claim 7 patentably distinguishes over the cited art of record for these additional reasons, beyond the reasons given above for its base claim 1.

Lastly, with respect to dependent claim 10, which recites features of a network comprising first and second signal lines, Yasuyuki et al. does not disclose, teach or suggest such features of a network. In more detail, the solid and dashed lines shown in Figure 2 of Yasuyuki et al. represent microwave signal paths, whereby each of the receivers 2 and 3 is

connected to base station 7 by its own respective signal line. Thus, the receiver 2 of Yasuyuki et al. cannot be selectively connectable to either a first signal line, a second signal line, or neither of the first or second signal lines, as explicitly recited in claim 10 (the same is true for receiver 1 of Yasuyuki et al.). For example, see the signal line connectivity shown in Figure 5 of the drawings of the present application, whereby such "selectable" connectivity is not disclosed, taught or suggested by Yasuyuki et al.

Accordingly, dependent claim 10 patentably distinguishes over the cited art of record for these additional reasons, beyond the reasons given above for its base claim 1.

Conclusion:

Since all of the issues raised in the Office Action have been addressed in this Reply, Applicants believe that the present application is now in condition for allowance, and an early indication of allowance is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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Attachment to After Final Response

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(54) Title of the invention: Video signal switching system

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Specification

1. Title of the invention:
Video signal switching system

2. Scope of the Claim:
Video signal switching system, characterised in that it is provided with a synchronising converter that synchronises two video signals to a base synchronisation; a switch that selects one of the two video signals that have been synchronised by the abovementioned synchronising converter; and a switch control circuit that detects abnormality in the burst signal and/or the synchronised signal of the abovementioned two video signals and creates a switch control signal for the abovementioned switch.

3. Detailed description of the invention:
The present invention relates to a video signal switching system for mobile outside broadcasting television.
In programmes where the television signal from a television camera in a mobile outside broadcasting vehicle is broadcast live (as in outside broadcasts of marathons, for example), the television signal is sent to the station by microwaves; however, the transmitted microwaves are disrupted by obstacles, and it is often difficult to broadcast consistently good footage. Consequently, the method adopted involves not one but an increased number of signal receiver points that receive the microwaves from the outside broadcasting vehicle, and undisrupted footage is selected by an operator and transmitted; but in the case of outside broadcasts of city marathons, for example, there are great number of obstacles, such as pedestrian bridges and road signs, and there are also other vehicles as obstacles, received signal misses and the like, and so the quality of the received signal image varies frequently with this method. At such times, manual switching is often inadequate, and the disrupted footage is often broadcast without further modification.

The aim of the present invention is therefore to provide a video signal switching system for mobile outside broadcasting that can, by the automatic selection of undisrupted images, broadcast images that are more stable than those of the prior art.

The present invention provides a video signal switching system for mobile outside broadcasting, comprising a first switch that selects two of the signals from a plurality of signal receiver points provided along the outside broadcast route; a write-to-memory means provided with a synchronising converter (frame synchroniser) that receives the two signals selected by the first switch, where this synchronising converter converts the two inputs to respective digital signals and writes them into a memory; a memory-readout means that reads the memory with standard timing; a second switch that selects two digital signals read from the memory; a converter that converts the digital signals selected by the second switch to analog signals; and a detection circuit that detects disruption of the images of the two inputs to the synchronising converter and creates a switch control signal for the second switch.

In the present invention, only the first switch, that selects two frame synchroniser inputs, is manually controlled, in response to movement of the mobile outside broadcasting vehicle; the switching in order to avoid frequent image disruption due to obstacles such as pedestrian bridges and road signs occurs automatically inside the frame synchroniser and so there are no mis-timings, the switch operator workload is reduced, and it is possible to transmit consistently stable footage. Furthermore, detection of signal disruption proceeds in the write-in side of the frame synchroniser and the correct image selection switching proceeds in the read-out side of the frame synchroniser and so by using the delay time between frame synchroniser input and output it is possible to select and switch to the correct video before the disrupted image is output.

The present invention is described in detail below with reference to figures which depict an embodiment. Figure 1 shows an example of a switch in an outside broadcast of a marathon, where the first to the fifth microwave signal receivers 1 to

5 are provided at appropriate intervals between the starting point/finishing line S and the turn-back point M and mobile vehicle 6 transmits at various different frequencies facing the nearest two microwave signal receivers. In Figure 1, frequency μ_1 is transmitted to first microwave signal receiver 1, and frequency μ_2 is transmitted to second microwave signal receiver 2. In the figure, the microwave frequency is given in brackets. The received signal output of the first to fifth microwave signal receivers is sent to base station 7.

Figure 2 is a detailed diagram of an outside broadcast shot in Figure 1. When mobile vehicle 6 is at point A, the obstruction afforded by U-shaped pedestrian bridge 8 results in a weak carrier electric field being delivered to third microwave signal receiver 3, and so there is disruption. However, second microwave signal receiver 2 can receive a signal correctly. Conversely, when mobile vehicle 6 has progressed slightly to point B, third signal microwave signal receiver 3 can receive a signal correctly, but the electric field to second microwave signal receiver 2 is weak and there is disruption. With the present invention, the switching at point A and point B occurs automatically and there is no disruption of the final output either at point A or point B. Moreover, there are limits to forecasting and switching when, as described here, there are rapid changes in the micro signal receiver function over short distances and it is clear that the present invention can alleviate the workload of the switch operator and prevent major misses.

The design comprising the frame synchroniser in base station 7 that receives the signals of first to fifth microwave signal receivers 1 to 5 is described below with reference to Figure 3. Switch 9 receives video signals v_1 to v_5 that have been taken up by the first to fifth microwave signal receivers, and two near mobile outside broadcasting vehicles 6 (Figure 1) are selected and sent to lines R_1, R_2.

Inside frame synchroniser 10, writing addresses are generated in response to the respective inputs corresponding to the 2 inputs and written into the memory. Therefore, low pass filter 11 (11'), A/D converter 12 (12'), writing clock generator circuit 13 (13'), synchroniser separator circuit 14 (14'), frame memory 15 (15'), writing address generator circuit 16 (16') and address selection circuit 17 (17') are

positioned in the two lines, respectively. Clock generator circuit 18, which creates and reads a readout clock from standard input R_f, and readout address generator circuit 19 are positioned on the read-out side. As a result, lines R_1, R_2 frame memory output is in phase vertically, horizontally and in terms of colour. The above-mentioned construction and operation are the same as those of an ordinary frame synchroniser and are therefore not described in detail. One of the two digital video signals read from frame memory 15, 15' is selected by switch 20 and output as a video signal via D/A converter 21 and low pass filter 22.

The control of switch 20 is described below. Synchronised signal disruption detection circuit 23 (23') and burst signal disruption detection circuit 24 (24') are provided in the two output lines R_1, R_2, respectively, and disruption of the signals output from the output lines is detected. Synchronised signal disruption detection circuit 23 (23') ascertains whether or not there is a synchronised signal, ascertains whether or not the phase of a previously detected synchronised signal is synchronised in phase with the base and outputs a detection signal in the event of abnormality. Burst signal disruption detection circuit 24 (24') detects the level of the burst signal, and if it is below a prescribed level, outputs a detection signal as an abnormality. Switch control circuit 25 which controls the switching of switch 20 receives four detection signals from synchronised signal disruption detection circuit 23, 23' and burst signal disruption detection circuit 24, 24' and controls switch 20 according to the logic of the four signals. Figure 4 is a logic table for control by switch control circuit 25. In this logic table, priority is high for synchronisation disruption due to burst level disruption, and so there is a good response to obstacles in practice.

The line R_1, R_2 signals switched according to the logic table in Figure 4 are originally the same signals and they have been brought in phase in terms of colour by the synchroniser function so it is possible to switch without any shock if they are the same in the 2 lines on the video level only and it is possible to select those that are always correct or nearly correct. The main features of the entire base station described above are that criteria are established using only the video signals and so there is no need to switch anything but the main line video, and that any

transmission path may be introduced between the micro signal receiver and the switch (SW_1). Furthermore, in the present invention, the switching occurs at the site of the digital signal that is read from the memory and this is clearly better than the situation where it is returned to analogue and then switched both in terms of managing the level and phase and because it avoids duplication of the D/A converter and the like.

It should be noted that mobile outside broadcasting has been described as an embodiment of the present invention but the present invention can, of course, also be employed for fixed lines and the like where obstacles are likely to arise.

4. Brief description of the Figures:

Figure 1 is a diagram showing the switching during the outside broadcast of a marathon; Figure 2 is a detailed diagram of an outside broadcast shot in Figure 1; Figure 3 is a diagram showing the design of an embodiment of the present invention; and Figure 4 is a logic table for switching control in Figure 3.

Agent: Patent Attorney Susumu UCHIHARA

Figure 1

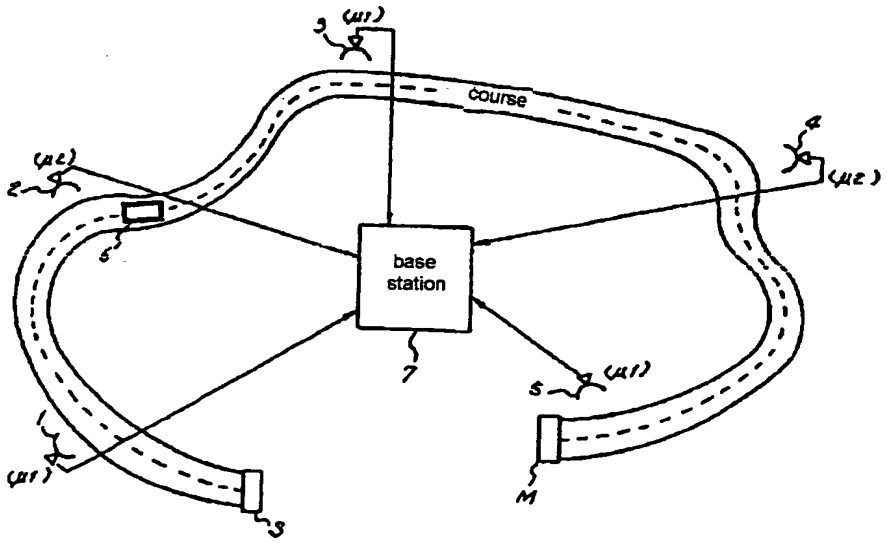

Figure 2

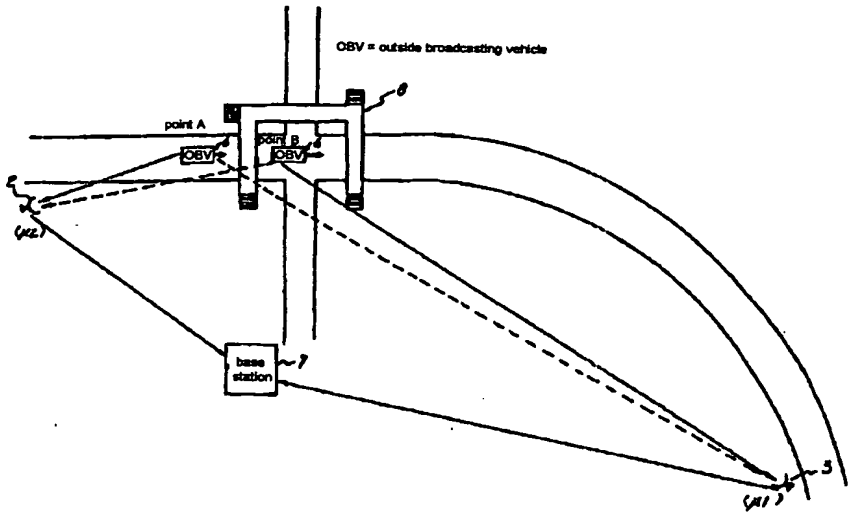
OSV = outside broadcasting vehicle
point A
point B
OSV
OSV
base station

Figure 3

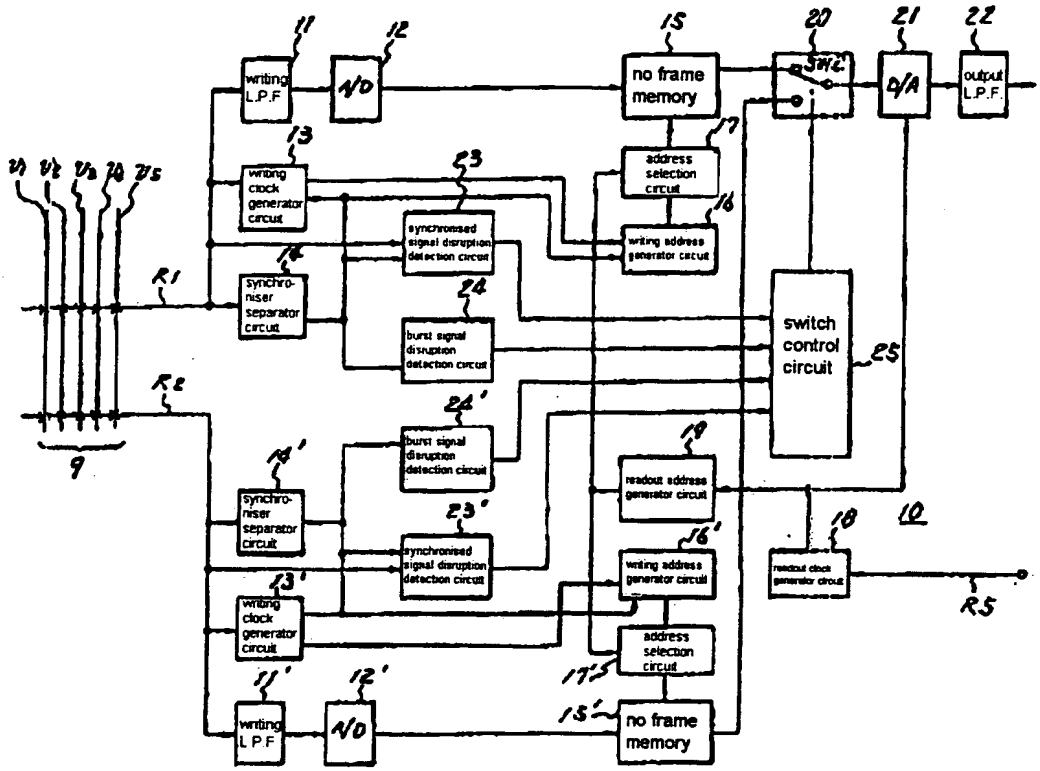
writing L.P.F
A/D
no frame memory
SW2
D/A
output L.P.F
writing clock generator circuit
address selection circuit
synchronised signal disruption detection circuit
writing address generator circuit
synchro-niser separator circuit
burst signal disruption detection circuit
switch control circuit
readout address generator circuit
readout clock generator circuit
R1
R2
R5
9
10

Figure 4

Line R_1		Line R_2		Result
Synchronised signal disruption detection circuit 23	Burst signal disruption detection circuit 24	Synchronised signal disruption detection circuit 23'	Burst signal disruption detection circuit 24'	
Correct	Correct	Correct	Correct	Route maintained
Correct	Correct	Correct	Disrupted	Line R_1 selected
Correct	Correct	Disrupted	Correct	Line R_1 selected
Correct	Correct	Disrupted	Disrupted	Line R_1 selected
Correct	Disrupted	Correct	Correct	Line R_2 selected
Correct	Disrupted	Correct	Disrupted	Route maintained
Correct	Disrupted	Disrupted	Correct	Line R_1 selected
Correct	Disrupted	Disrupted	Disrupted	Line R_1 selected
Disrupted	Correct	Correct	Correct	Line R_2 selected
Disrupted	Correct	Correct	Disrupted	Line R_2 selected
Disrupted	Correct	Disrupted	Correct	Route maintained
Disrupted	Correct	Disrupted	Disrupted	Route maintained
Disrupted	Disrupted	Correct	Correct	Line R_2 selected
Disrupted	Disrupted	Correct	Disrupted	Line R_2 selected
Disrupted	Disrupted	Disrupted	Correct	Route maintained
Disrupted	Disrupted	Disrupted	Disrupted	Route maintained